

for determination of time, and the authorities of the U. S. Naval Observatory confided to the expedition the photographic instruments which had been employed by the American parties on the occasion of the late Transit of Venus, for comparison with those brought from France. M. Sainte-Claire Deville in communicating these particulars to the Paris Academy, adds—"Il suffit de publier tous ces détails pour que la gratitude de tous les savants soit acquise à de pareils actes de confraternité scientifique."

**KEPLER'S MANUSCRIPTS AND RELICS.**—In the last Annual Report of the Director of the Imperial Observatory at Pulkowa, M. Otto Struve, to the Visiting Committee, attention is called to an interesting acquisition recently made by this great astronomical establishment. It is known that the library possesses, in addition to all the notable published works of Kepler, the nearly complete collection of his manuscripts. This circumstance caused Prof. Galle, of the Observatory at Breslau, to inform M. Struve that certain articles of which the last direct descendants of Kepler, resident in Silesia, were in possession, and which had been religiously preserved in the family as memorials of their immortal ancestor, might be obtained by purchase, and the result has been that they are now deposited at Pulkowa, to be preserved with other astronomical treasures, which the Struves, father and son, have secured for the institution. Amongst these articles are particularly mentioned two miniature portraits on copper of Kepler and his first wife, at the time of their marriage, and a memorandum-book used by his first wife and continued by his eldest daughter.

**THE PULKOWA LIBRARY CATALOGUE.**—In the same Report from the Director of the Russian Observatory, it is mentioned that a continuation of the Catalogue of the valuable library has been some time in preparation, the numerous additions, upwards of 10,000, which have been made to it since the publication of the first Catalogue in 1860, rendering a more complete work very desirable. M. Otto Struve justly remarks that the Catalogue of 1860 has had its uses beyond the pale of the establishment, and we feel sure that workers in almost every branch of astronomy will bear witness to the assistance they have received from that excellent and well-arranged analysis of the contents of this important library, whereby they will have been guided with comparative facility to a knowledge of the literature special to particular astronomical subjects upon which they have been engaged.

### GEOGRAPHICAL NOTES

**ROUND THE WORLD.**—The French Société des Voyages Autour du Monde, have obtained the steamer *Picardie*, of the company Valéry frère et fils, of Marseilles, in which to make their intended voyage round the world. The vessel is 1,560 tons and 1,000 horsepower, and is fitted up in the best manner. She is announced to leave Marseilles on June 30 under the command of Lieut. M. G. Biard. The staff is complete, and it is stated that the passenger list will shortly be closed. This project seems likely to have a better result than the much-talked-of American Woodruff Continental Voyage Round the World, which from the first seems to have been utterly hollow, and collapsed on being probed.

**AFRICA.**—In his recent journey in East Central Africa, the late Capt. Elton, H.M.'s Consul at Mozambique, paid considerable attention to the northern end of Lake Nyassa, which was previously very imperfectly known. He arrived, we believe, at a very positive conclusion that no river flowed out of the lake, but he discovered an important and navigable affluent, the Rombashi River. This he considered to be well suited for the late end of

the caravan road from the coast. This road, which is being constructed by private enterprise and under the supervision of English engineers, starts from Dar-es-Salam, some twenty miles to the south of Zanzibar, and thirty or forty miles of it have already been completed. When finished it will, no doubt, have an important bearing on the future of this part of Africa, and it will open up to commerce and civilisation a region a considerable portion of which has remained hitherto entirely unexplored.

The Abbé Debaize, who recently received a subvention of 100,000 francs from the French Government for purposes of African exploration, left Marseilles on April 20 for Zanzibar, where he will arrive at the end of May. He will remain there for some time in order to make the most complete preparations for his journey across the Continent, which is expected to occupy three years. The same steamer carried nine French missionaries despatched to establish posts at the Victoria Nyanza and Lake Tanganyika.

### NOTES

**PROF. HUGHES**, the well-known inventor of the type-printing apparatus so largely employed on the Continent, has made the wonderful discovery that some bodies are sensitive to sound as selenium is sensitive to light. If such a body be placed in the circuit of a small battery it will be so affected by the sonorous vibrations when spoken to as to replace entirely the transmitter of a Bell telephone. Conversation, music, and all the sounds transmitted by an ordinary telephone are easily reproduced. A mere scratch with the finger-nail, or a touch with the soft part of a feather is distinctly transmitted. The sonorous vibrations produce strains in the conductor, which cause variations in the resistance of the circuit, and thereby produce similar variations in a current flowing through that conductor.

THE French deserve all the praise that has been recently lavished upon them for the energy and determination and sound judgment with which they have quietly carried on the preparations that culminated in the imposing ceremony of yesterday. Their new Exhibition is the one bright spot in the European horizon at present. Even till very recently many doubted whether these preparations would ever come to anything, partly on account of the disturbed state of Europe, and partly because the earnestness and perseverance of the French as a people were doubted. We have had frequent occasion recently to bring before our readers evidences of the renewed energy of the French in respect of scientific research; and the unprecedentedly magnificent display which now divides the attention of the world with the Eastern crisis, is only one of many other proofs that the French are rapidly achieving for themselves a position more solid than ever they held before. The world, then, is once more taking stock of her industrial riches, and ever since the Exhibitions of Vienna and Philadelphia, the discoveries and applications of science have been so many and so rapid that the Paris Exhibition must present many new features. For, indeed, however much the great mass of visitors may ignore it, the multitudinous display that was opened yesterday, is simply a specimen of the gifts of science to humanity, as the French themselves would say. Judging from the catalogues British trade is well represented, and our principal scientific-instrument makers are well to the front; but British culture and British science are nowhere, and, as we have said already, the British Commissioners have lost a splendid opportunity, and will have simply nothing to show beside the magnificent educational and scientific collections of France herself. We have already spoken at length of the many preparations made for representation of French science—scientific conferences, the scientific lectures, scientific excursions, besides the great display of

scientific exhibits; the British Department will be nothing more than a trade show. Let us hope that the British Commissioners and British visitors generally will return from Paris ashamed of their shabby display, and filled with a sense of the vast national importance of science, which in the case of France, it will be seen, truly "exalteth a nation."

THE large fresh-water and salt-water aquariums in the Trocadero Gardens at the Paris Exhibition were stocked last week. A regular service of barges is engaged in bringing daily quantities of sea-water from the coast to supply the second aquarium.

THE amount proposed to be spent upon the building of the new Natural History Museum at South Kensington for the present financial year (1878-79) is, according to the Civil Service Estimates, 80,000*l.*, being 10,000*l.* more than last year. Of this sum, 60,000*l.* is for the building, which is now verging towards completion, and 20,000*l.* for internal fittings. We are pleased to see that the authorities are already turning their attention to the last subject, but should they not also begin to think about a *library*? As regards scientific work, the natural history collections in their new house will be absolutely *useless* without a library. Our readers may possibly think that a scientific library may be got any year by the use of a certain quantity of money, but they will find themselves very much disappointed when they attempt to try this experiment. The fact is, such a library as is required for the use of a great national museum can only be picked up by slow degrees, and so soon as it was determined to move the collections away from the great public library in Great Russell Street, steps should have been taken to form a new one for the collections in their new site. This, however, does not appear to have been thought of yet.

OUR readers will be glad to hear that Prof. Clifford, who is at present at Gibraltar, is somewhat better.

THERE was a *conversazione* at the Royal Society last evening.

THE Vice-Chancellor of Cambridge University has appointed Prof. Clerk Maxwell Rede Lecturer for the ensuing year.

AN agreeable variation on the daily news from Constantinople is the report of the completion of the Museum of Antiquities in the Turkish capital. In 1875 Arifi Pacha, the Minister of Instruction, ordered the renovation for this purpose of an old kiosk on the Seraglio Point, built in 1471 by the conqueror of Constantinople, and the work has been pushed steadily forward, even despite the war, until now a spacious edifice, richly decorated with marble, is ready to receive the archaeological collection of the city. Visitors at Constantinople who have found their way to the dark, dusty hall in the arsenal, where quantities of valuable antiquities were crowded together in chaotic confusion, will appreciate the value of this ample provision for their exhibition, especially for the extensive collections resulting from Schliemann's excavations at Troy. A school of archaeology is to be established in connection with the museum.

WE have variety enough of Associations, learned and otherwise, in this country, but none corresponding to that which met on April 24 and subsequent days at the Sorbonne, composed of the delegates of the various learned societies throughout France, and founded by Leverrier many years ago. We have the elements for such an association in abundance; and, indeed, concretions of greater or less extent have begun to form in different parts of the country. There is, for example, the Cumberland Association, which met last week, and which, if not founded by our national astronomer, like the French Association, had the honour of listening to what he describes as probably

his last public lecture. Then there is that extensive association of societies and field-clubs in Yorkshire, which publishes a journal of its own; and most recent of all, there is the Midland Union, with head-quarters at Birmingham, extensive ramifications, and "running" an excellent magazine, the *Midland Naturalist*. But there is room for something more national and more universal than any of these, and not interfering with their action at all; and as a preliminary step we would suggest that a general meeting of delegates from the various local societies throughout the kingdom should be held at some central city. Such a meeting might be useful in many ways, leading as it might do to united action with regard to common interests, as useful, indeed, in respect to our local societies, as the recent Conference of Librarians has been to the libraries of the world. If properly organised we believe the meeting would become an annual institution.

THE President of this year's meeting, the sixteenth, of the French Learned Societies, was M. Milne-Edwards, who devoted his opening address mainly to the memory of the Association's founder, Leverrier. The number of delegates was smaller than in former years, many of them having postponed their visit to Paris till the Exhibition was opened, and the discussions seem to have lacked the keenness and impressiveness which always characterised them when Leverrier presided. The first two days were devoted to sectional meetings, and on the concluding day the distribution of prizes took place, as usual under the chairmanship of the Minister of Public Instruction. An immense crowd had been attracted in the hope of hearing from M. Bardoux himself what was the intention of the Government with regard to education; but he postponed any definite statement to the month of October, when the association will hold a supplementary meeting after having taken part in the several scientific congresses and lectures held at the Trocadero. He reviewed all the improvements realised last year in the educational system of France. "Soon," he said, "everywhere when the want will become manifest, libraries, laboratories, and collections will be established exhibiting the passionate zeal of Government for everything which touches the superior interest of instruction. A time will soon arrive when every hamlet will have its own school and when the tools of intellectual work will be at the disposal of every seeker." There can be no doubt of the sympathy of the present French Government for every form of scientific effort. Some important scientific papers were read during the meeting, but we cannot at present do more than mention the fact. In the scientific section gold medals were assigned to M. Cailletet for the liquefaction of gases, Dr. Armand for explorations in Cambodia and Laos, General de Nansouty, founder of the Observatory on Pic du Midi; Prof. Terquem for physical researches, and Prof. Houel for mathematical works.

ALTHOUGH no allusion was made by M. Bardoux in his address at the Sorbonne to the contemplated improvements meditated for French meteorology, we can state that he will ask from the French Parliament a credit of 10,000*l.*, and 2,000*l.* for five successive years, in order to organise in France ten large meteorological observatories, possessing each a complete set of registering instruments. The contemplated institutions, some of which have been already created, will be located at Lille, Paris (Montsouris), where M. Marie Davy will be continued superintendent, at the country seat of Mr. Hervé-Mangon in the department of La Manche, where a private observatory has already been organised, at Bordeaux, Toulouse, Marseilles, Lyons, Besançon, and the three elevated observatories, Pic-du-Midi, Pay-de-Dôme, and Mont Ventoux.

THE Annual Meeting of the Cumberland Association for the Advancement of Literature and Science may now be regarded

as an established institution. The gathering at Cockermouth on Monday and Tuesday last week was large and successful. The event of the meeting was no doubt Sir George Airy's Address, which we hope to give next week, but there were other addresses and papers read which would do credit to more pretentious associations. The president, Mr. Isaac Fletcher, M.P., F.R.S., in his address, gave an interesting sketch of George Graham, the eminent horologist of the eighteenth century, who was a Cumberland man. Mr. Clifton Ward, to whom the success of this Association is largely due, read a valuable paper on Quartz in the Lake District. The telephone of course was exhibited, and several interesting excursions made; and last, not least, the Report tells us that the Association and its affiliated Societies are prosperous. Why should not each county or group of counties, have a similar association? The Midland Union of Natural History Societies, numbering over 2,000 members, are to have their meeting at Birmingham on May 27 and 28; and judging from the brief programme it promises to be an interesting one. With independent sources of many-sided and vigorous activity in the country like Birmingham, there is no danger of over-centralisation.

AN alarming paragraph recently appeared in the Swiss correspondence of a German paper, which, affecting as it does the existence of the St. Gothard tunnel, we are surprised that it has not been even referred to in English journals. The paragraph stated that the great engineering undertaking of boring through the St. Gothard was threatened by the possibility of a severe check in a direction hitherto unexpected. "The geologists engaged in the work," it was stated, "have lately noticed a peculiar depression of the strata through which the tunnel is progressing, leading to the suspicion that a subterranean sea occupies the interior of the mountain chain at this point. The last report laid before the Swiss Federal Council, states that these indications are becoming more and more decided, and it is expected that the next 700 feet of boring will yield decisive proofs for or against this theory. If the fears prove true, the whole of the work on this magnificent undertaking, will come to an abrupt and unfortunate conclusion." These sentences partake of the usual character of what may be called "newspaper science." They contain just enough of scientific phraseology to impress the ordinary reading public with the importance of their announcement; while at the same time their statements are so vague as to afford the reader who knows something of the subject no means of deciding whether the thing is a hoax or may have some kind of foundation in fact. Happily the apparently insuperable difficulty has been boldly faced with the usual results. A recent report of the inspector of the tunnel states that the irregular character of the formations pierced by the tunnel, which led to the above fears, has entirely ceased, and that the work is now progressing through uniform regular strata. On the south side the boring progresses at the rate of ten feet daily through gneiss. The rate is somewhat less on the north side, where the tunnel is not yet out of the serpentine. The thickness of this stratum of serpentine now being pierced is already the double of that estimated by geologists from the surface indications.

THE forty-ninth anniversary meeting of the Zoological Society was held on Monday. The report of the Council stated that the number of fellows, fellows-elect, and annual subscribers, at the close of the year 1877 had amounted to 3,358, showing a net addition to the list of 47 members during the year 1877. The income of the Society in 1877 had amounted to 30,988*l.*, being, with the exception of 1876, a larger total than the receipts of any previous year since the foundation of the Society. The total ordinary expenditure of the Society in 1877 had been 27,290*l.*, the remaining sum of 1,711*l.* having been devoted to

certain special objects, such as new buildings. The Society has purchased the freehold of the present house (11, Hanover Square), and of the house immediately adjoining it at the back (314½, Oxford Street). The total assets of the Society on December 31, 1877, had been calculated to be 17,989*l.*, while the liabilities were reckoned at 4,019*l.* The total number of visitors to the Society's gardens during the year 1877 had been, according to the report, 781,377, a number greater than had been recorded in any previous year except in 1876. With regard to the state of the menagerie, it was stated that the total number of animals belonging to the first three classes of vertebrates living in the Society's menagerie at the close of 1877 had been 2,200. The total number of registered additions to the menagerie in 1877 had been 1,260. The Marquis of Tweeddale, F.R.S., was re-elected president; Mr. Robert Drummond, treasurer; and Mr. Philip L. Sclater, Ph.D., F.R.S., secretary to the Society for the ensuing year. The new members of the Council elected were—Sir Joseph Fayrer, K.C.S.I., F.R.S., Lieut.-Col. Godwin-Austen, Dr. Günther, F.R.S., Dr. Edward Hamilton, and Prof. Huxley, F.R.S.

DR. F. V. HAYDEN sends us a first proof of a plate to appear in one of the volumes of the Bulletin of the U.S. Geological Survey, in which is represented the greater part of a fossil skeleton of a very remarkable new bird about to be described by Mr. Allen under the name *Palaeospiza bella*.

THOUGH we have not heard of or from Mr. Benson for some time, he has not been idle. Two papers by him are now before us. In one of these ("Facts and Figures for Mathematicians; or, the Geometrical Problems which Benson's Geometry Alone can Solve") the problem is, "given the area of a circle, say of one acre, to find that of another circle, which being described from a point as centre, on the circumference of the given circle, shall have that portion of its area outside the given circle equal to the area of the given circle." A similar problem to this vexed us in our undergraduate days. We were required to find by purely geometrical means (if possible) the length of a chain which, fastened to a stake in the boundary of a circular field, would allow an ass to graze over just half the field. Mr. Benson says the solution depends upon the *actual*, not the supposititious properties of the circle, and therefore the result as given in the *Scientific American* (where the ratio of 1 to 1.158728 is stated to be the one required) "which is based upon the false supposition that the circle has similar properties to those of the polygon" is erroneous. It may be remembered that Mr. Benson will have it that the value  $3.1415926 \times R^2$  for the area of a circle is wrong. As we stated in our notice of the "Geometry," our author maintains that the reasoning mathematicians employ to get this result is fallacious, and in his opinion he makes this easily evident. He still holds that  $3R^2$  is the area.

"A man convinced against his will  
Is of the same opinion still."

Mr. Benson argues *more suo* in the twenty-two pages which he devotes to the problem. The second publication ("New Mathematical Discoveries") is a four-page one, and is concerned with the discovery of Archimedes that the proportion between the parabola and the rectangle on abscissa and ordinate is in the proportion of 2 : 3. From the proof employed to show this, he comes round to the circle again, and gets area =  $3R^2$ . To judge by the printed letters, Mr. Benson has adherents to his views; among them one a graduate of the Polytechnic School in Paris, writes that "they (these discoveries) will revolutionise the mathematical world," and he is translating them for publication in France. Mr. Benson (whose motto should be "indefessus agendo") is engaged upon "Philosophic Thoughts in all Ages" and "Geometer's Manual," containing history of geometry and correspondence



with prominent English and American mathematicians on new geometrical subjects. Our author has a mission; if any hold with him, they should write to L. S. Benson, 149, Grand Street, New York City, and become the happy possessors of a copy of "Facts" for thirty cents. *De gustibus non disputandum.*

THE *North China Herald* reports a curious desire for improvement on the part of two Korean medical men, who belong to a nation which has hitherto shown itself the most determined in its self-isolation. These men have applied to Dr. Dudgeon, the Superintendent of the London Mission Hospital, for permission to attend there during the stay of the Korean embassy at Peking. They are described as very intelligent men, and they speak very disparagingly of their own medicine. For years they have been studying Hobson's medical works in Chinese, and they have also obtained Dr. Dudgeon's Anatomical Atlas. They are greatly interested in vaccination, and wish to introduce it into Korea. The stringency of Korean laws prevents natives from living out of their own country, but the next time the embassy visits Peking these two men intend to devote more time to the study of foreign medicine and surgery.

ALTHOUGH the existence of kerosene oil in several of the provinces of Japan is said to have been known for 1,200 years, the Japanese did not know how to refine it till about six years ago. Now, however, refining establishments are springing up rapidly, and its manufacture is becoming an important industry.

AT Dresden a new journal appeared on May 1 entitled *Zeitschrift für Museologie und verwandte Wissenschaften*; the editor is the Director of the celebrated "Grüne Gewölbe," Hofrath Dr. Grässe, the publisher, Herr T. M. Hofmann. Thus the circle of "collection-journals," i.e. journals for archives, libraries, and museums, is complete.

A GERMAN inventor has found a new use for asbestos, in the shape of leaves for a bank-note-album. These albums are said to protect bank-notes or other valuable documents to such an extent, that if they are laid between the leaves and the album is closed firmly, they even remain legible after being burnt to cinders.

MR. F. C. PENROSE writes to the *Times* from Copse Hill, Wimbledon, that on April 24, at 8.12 P.M., he saw an unusually fine meteor descending at a very steep angle, and when first noticed, at about 2° to the north of the bright star Procyon, and sloping a little to the north. It was yellowish, and although not in itself intensely bright, from its apparent size (5' long and 3' broad by estimation), surpassed the light of Venus at her maximum. It was as usual pear-shaped. After a course of about 10° from the point first mentioned, it left behind it three or four very bright blue star-like points, and vanished in a clear sky at about an altitude of 22° and 57° west of south. No sound of explosion was heard.

A PERUVIAN chemist, Dr. Arosemano, will exhibit an invention at the Paris Exhibition, which may become a very important one for commerce. He has succeeded in obtaining a magnificent dye from the violet or maroon Welshcorn of Peru, and this dye is said to impart the colour, odour, and taste of claret to all light white wines to such a degree, that it is impossible to distinguish the coloured wine from real claret, without being in the least injurious to the health of the consumer. Besides this a number of other uses are mentioned to which this Welsh corn-dye can be put.

THE German Telegraph Office is rapidly introducing the telephone; 68 stations are already provided with this instrument, 41 others will have it in a few weeks, and 111 more before the end of the year; thus there will be then a total of 220 telephone-stations in Germany.

To commemorate the 100th anniversary of the discovery of the Sandwich Islands by Cook, a statue of the great discoverer will be erected on Diamond Peak, a burnt-out crater near Honolulu.

SEVEN extremely interesting pictures are now being exhibited at Berlin by the painter, Herr J. L. Wensel; they represent scenes from the second German North Polar Expedition during the years 1869 and 1870, and are executed after sketches made on the spot by several members on the staff of the expedition.

THE Conference on the National Water Supply, in connection with the Society of Arts, will meet on the 21st and 22nd inst., and will be followed on the 23rd and 24th by a Conference on the Health and Sewage of Towns.

THE additions to the Zoological Society's Gardens during the past week include a Beisa Antelope (*Oryx beisa*) from North-East Africa, presented by H.H. the Sultan of Zanzibar; an African Leopard (*Felis pardus*) from Africa, presented by Mrs. Kirk; a Black Wallaby (*Halmaturus ualabatus*), a Laughing Kingfisher (*Dacelo gigantea*) from Australia, presented by Mr. D. W. Barker, jun.; a Sand Lizard (*Lacerta agilis*), a Smooth Newt (*Triton teniatus*), European, presented by the Masters W. L. and B. L. Slater; a Common Seal (*Phoca vitulina*) from British seas, a Cariama (*Cariama cristata*) from Brazil; a Guira Cuckoo (*Guira piririgua*) from Para, a Crested Curassow (*Crax alector*) from Guiana, a Bar-headed Goose (*Anser indicus*) from India, a White-faced Tree Duck (*Dendrocygna viduata*) from Brazil, a Red-billed Tree Duck (*Dendrocygna autumnalis*) from America, a Blue-bonnet Parrakeet (*Psephotus hemato-gaster*) from Australia, purchased; a Bennett's Wallaby (*Halmaturus bennetti*), born in the Gardens.

#### THE UNIVERSITY OF OXFORD COMMISSION

THE Vice-Chancellor has received from the University of Oxford Commissioners a Statement with respect to the main purposes relative to the University, for which, in their opinion, provision should be made under the Act, the sources from which funds for those purposes should be obtained, and the principles on which payments from the colleges should be contributed. The statement is somewhat similar to that published in reference to Cambridge some weeks since, only more detailed.

As to the main purposes relative to the University for which provision should be made under the Act, the first in order of these purposes is, in their opinion, the extension and proper endowment of the professoriate, and the better organisation of University teaching. As to which two principal objects should be kept in view:—1. The due representation at Oxford of every considerable branch of knowledge, the advancement of which can be effectually promoted by the University, as a place either of education or of learning and research; and 2. The due participation of the University itself, as distinct from its colleges in the direction and improvement of the studies of its undergraduate and other students.

The Commissioners are unable to adopt the views of those who would desire to transfer to the University the whole or the chief part of the teaching work now done by the colleges either separately or by means of intercollegiate arrangements. They think that among the recognised studies of the University there are some (such as natural science) for which the colleges cannot be expected to make adequate provision, either without, or by means of, those intercollegiate arrangements.

Many of the existing professorships are inadequately endowed, and ought to have their emoluments increased. Of a few the emoluments are in excess of what we think necessary. There are others the constitution, designation, and duties of which may, when they become vacant, be advantageously modified. The Commissioners also think that some new chairs should be established and adequately endowed.

The stipends of the professors (other than those of the theological faculty) should, in the Commissioners' opinion, be of varying amounts, according to the relation of their several